

----- the newsletter of the Sinclair Computer Users Society -----  
**SINCUS NEWS**  
 1229 Rhodes Road  
 Johnson City, New York 13790  
 ----- since 1982 -----

Another year rolls around, SINCUS is another year older, it's almost Thanksgiving time, and the Christmas shopping season is bearing down hard. By the time this arrives, many will think perhaps that SINCUS NEWS was not gona make it, I had my doubts too! So many excuses for being so late, that I think I'll save a few for the next time. Basically the SINCUS computer system has been on the fritz for about two months, and the cause of the problem MAY have been something as simple as the 2068 power supply hitting the rocker on/off switch on the power strip setting it in the middle position (almost on and almost off). I would get crashes, printer head resets, disc drive runs and gliches across the monitor screen without apparent cause. Everytime I took off a plug-on (like the modem or printer) the problem dissappeared for a couple days then return. Clyde and I heard the noise coming from the setup, and I'd swear it sounded like a popcorn popper and I'd yank the power supply cord out, and wait to see what smoked. But since the fixing of the power strip on/off switch, no more crashes, but minor screen distortion every now and then.

The Larken Cartridge arrived late in October, and with much trying to create the "Max-Dos" like Bill Jones, of Updates, we got "nos-gos". The Oliger and LKDDOS work seperate but side by side, but not together as Bill got his dual system to work. The other glich is that the LKDDOS cartridge which was modified with a disable switch to the 74LS74 chip requires RAND USR 100 before each command, and it doesn't recognize Print #4:Command and the demo disc will load a menu, but that's it. So not only is it not able to work with the Oliger system, I can't make Larken discs unless I take the 'B' board outa the Oliger interface. And to make the Larken discs, I'll have to go back to tapes to make an orginial disc, not being able to copy the Oliger disc material to Larken discs. Well, I have a couple letters off trying to solve that problem. Meanwhile the offer of Larken disc material on Computus Interruptus, and Sincus News back issues is temporarily withdrawn. Anyone else out there try this with similiar results, let me know if you were able to solve it, or wait a while and I'll let all know the outcome. In the October issue of Updates, Bill Jones was kind enough to give Sincus a whole page worth of (cont)...

Rest of the 1988 schudule-below; Vestal Library, 7p on Wednesdays. For 1989, it will be the 3rd Wednesday of each month, same time and place.

page 1.....	Meet News, club notes	+	-----	Meeting DATES 1988	-----
page 2.....	NEWS & REVIEWS, etc	+			
page 3.....	Don's 1000's tips	+		Nov 30	Wednesday
page 4.....	Part 1, 1000's SCL map	+			
page 9.....	Paul's page on Pascal	+		DEC 21	Wednesday
page 10.....	Club Notes, policy	+			
		+		JAN 18	Wednesday
	Have a HAPPY THANKSGIVING,	+			
	a MERRY Christmas,	+		Wednesday	
	and a Happy NEW YEAR! 1989	+			
	--- Support your local User Group today! ---	+	-----	7pm Vestal Library	-----

attention. [I heard back from Bill Jones, and the big difference maybe the Oliger EPROM is of a different manufacturer and that could be the hang up. Well another letter is off to John Oliger for his thoughts on the matter.] He also referred to TDM's newsletter contest, and some how we are rated number one. SINCUS NEWS tied for ninth place. I hope this rating of one newsletter over another doesn't mean too much too many people, as you could subscribe to a highly rated newsletter one day, and be highly disappointed the next. The cure for that is to write an article, or start a series, or send in programs to be printed, and not only will the next issue have a brilliant article by a genius of an author, but you will become famous in timex/sinclair land.

For those who attend in upcoming months, COFFEE will be served. Thanks to Dave S. and his proposal, and Mr. Penney is bringing the cups, You can enjoy a brew while you warm up on a cold wintery eve for the next half year. Don't forget the coffee Dave! John C. donated a joystick to the society computer system, it (the SINCUS system) grows every month. Don Lamen has submitted a very large article on the TS1000, and it will start in this issue and run thru the next couple. Lots of artwork with it. Plus Don puts in a bi-monthly article of TS1000 tips. Thanks Don, we all appreciate it. SINCUS sent in a check to become a group member of SNUG. We are encouraging any and all to send in to SNUG their support. In case you lost the address it is SNUG, 7515 Arbordale Dr., Port Richey, FL 34668. Money back if they don't get enough support. These guys are going to try to be a central clearing house for any and all programs, user groups and users and where to get what information. Hope they gotta disc or two!

### News, New, Views and Reviews.....Paul Hill

Curry Computer, POB 5607, Glendale AZ 85312-5607; Tele 602- 878 - 2902 has a catalog dated Oct 15, 88, and much software for the 1000, 2068, Spectrum and QL and some hardware plus Amstrad Computers, printers modems, and the Z88 and Psion Organiser and the Sharp 4501-3 for \$799.95.

Emsoft of Estate Management Services, POB 8703, Boston, MA 02114-8763 (tele)617-889-0830: QL software Tax-I-QL; QLUTter an intergrated set of disk management utilities; SuperBasic, DataBase Programs, Mailbag and CAM Master (make cam designs) QLBusiness; for the 1000/1500 Siriusware programs, WORD\*, File\*, A\*SORT.

Cambridge Direct, 1419 Lake Cook Rd., Deerfield IL 60015 sells the Z88; call 1 800 435 7729; order yours, use charge card; see ads in Byte, Lotus, Computer Currents for prices. TSUGs call 312 940 0084 for details on group buys-Kevin Jeffers, Pres.

From the "Plotter", Clackamas County Area TSUG, (CCAT/S, 1419 1/2 7th Street, Oregon City, OR 97045.) reports the August TS USER Mini Fair cost them about \$500 more than they made. Apparently more said they were interested in attending than actually showed up. RMG reports that Larry Kenny (LARKEN) is coming out with a mini Terminal/BBS program for use with his disc system, cost about \$19.95 plus S&H. Also a sequential filing disc, is in the works. Stan Lemke's Pixel Print Pro is ungoing testing for a Larken version. RMG's BBS is gona be pulled 12-31-88 due to lack of use. Dick Wagner reviewed VU-CALC (Jack Dohany's revision) and it's updated for full size printers, save to micros/tape or disc. Makes the use of Vu calc easier, faster, more accessable. Read the article or write to Jack Dohany, 390 Rutherford Ave., Redwood City, CA 94061 for his catalog, a stamp wouldn't hurt.

From "TS Bulletin", Bill Harmer, 97 Ruskin St., Ottawa Canada K1Y4B3, a newsletter dedicated to LOW cost computing. This #7 - 88 issue has several interesting and long articles on history and helpful hints for your computing enjoyment. Heavy on the TS1000, and lots of interest history on what used to be in the computing world.

We are and have been swapping with "FDD Express", I would report on what Ron says here, but Updates carries a reprint and FDD problems dont seem compatiabile with Oliger disc ways and means, so if you have a FDD disc system contact Ron Havlen, 4307 Chambers St., Horseheads, NY 14845.

**ZX/81-TS1000 Tips.....By Don Lamen, SINCUS**

12. Here is a set of Machine code routines that uses a Floating Point Number as an address. It is a very useful set of routines, as it enables you to input strings with machine code. We actually use the BASIC interpreter by copying the BASIC commands into the Print buffer everytime we need an input and make the BASIC Interpreter run it, then return to the Machine Code. For example we will set RAMTOP at 29952 (7500h) and our entry point to input A\$, at 30000 (7530h). The routines are:

Storage:  
 7500 0000                      Stores: SPARE 3  
 (29952) 0000                      SPARE 4

4 Bytes

Commands:

7504	0000	0400	EE	26	0D	76 ; Input A\$
	LINE	COUNT	RAND	USR	0	NUMBER
750C	0000	0A00	F9	D4	IC	7E; RAND USR 751B
	751B		N/L	N/L		
7514	BFEA	360000	76	76		(29979)

23 Bytes

751B	E1	RAND	USR	0;	POP	HL
	ED	7B	7B	40	LD	SP, (SPARE 2); Restore SP
	2A	00	75		LD	HL, (SPARE 3);
	22	29	40		LD	(NXTLIN), HL ;(Restore NXTLIN)
7526	2A	10	40		LD	HL, (VARS) ;get A\$
	23				INC	HL ;skip over string name
	4E				LD	C, (HL) ;Low count
	23				INC	HL
	46				LD	B, (HL) ;Hi count
	23				INC	HL
	7E				LD	A, (HL) ;1st byte of A\$
	C9				RET	

21 Bytes

Note: This routine returns with HL pointing to the 1st byte of A\$, BC contains the count and A contains a copy of the 1st byte.

7530	ED	73	7B	40	INA\$:	LD(SPARE 2), SP ; SAVE SP
	2A	29	40		LD	HL, (NXTLIN)
	22	00	75		LD	(SPARE 3), HL ; SAVE (NXTLIN)
	CD	9A	14		CALL	149A, CLEAR
	21	04	75		LD	HL, Commands
	11	3C	40		LD	DE, PR-BUFF
	01	17	00		LD	BC, 0017 ; 23 bytes
	ED	B0			LDIR	; Copy up
	21	76	06		LD	HL, 0676 ; Next-line
	E5				PUSH	HL
	21	3C	40		LD	HL, 403C ; PR-BUFF
	22	29	40		LD	(NXTLIN), HL
	C9				RET	

35 Bytes  
**83 BYTES TOTAL**

## EXPLORING THE TIMEX/SINCLAIR 1000'S

## SINCLAIR LOGIC CHIP

( SCL )

by

Don Lamen, SINCUS

6-29-88

ACKNOWLEDGEMENTS:

Toni Baker's book "Mastering Machine Code On Your ZX/81" was a big help in disassembling the ROM code and printing it out.

Dr. Ian Logan's & Dr. Frank O'Hara's book, "The Complete Timex TS 1000 / Sinclair ZX 81 ROM Disassembly" was a big help in understanding what I had printed out.

National Semiconductor's "TTL Data Book" made it possible to select the standard ICs for drawing the simulation circuits.

Zilog's Technical Manual on the Z-80 Microprocessor was very helpful, in this study, as to timing.

Time Designs Magazine for clarifying some points pertaining to the I/O section and the Frame sync timing.

There are many others who have added to my knowledge and understanding.

I wish to thank one and all for their many contributions.

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The History and The Problem:

Early in 1982, I believe in either February or March, I bought my first TS-1000 computer. At the time, I was building my own computer based on the S-100 bus using the Z-80 microprocessor as the CPU. I bought the TS-1000 intending to use it to write the ROM and Character Generator for the computer that I was building.

When I plugged it in and tried it out I discovered that the little TS-1000 with a 16K RAM pack would do a lot more than the computer that I was building. The whole TS-1000 system cost less than what I had spent building one BK RAM board and the power that it used was next to nothing. Needless to say, my S-100 computer construction stopped the day I bought the TS-1000.

Now I have seven computers and four of them are Timex / Sinclair computers. All of the Sinclair computers are excellent computers and with the proper peripherals they will measure up to anything on the market in the microcomputer field. These computers are also very portable. Since 1940 I have worked and played with computers, Mainframes, Minnies and micros. We have come a long way since the old 6SN7 flip-flops.

Now for the problem part. It is my opinion that in order to get maximum utility from any device you need to know exactly how it works. Since the day I bought my first TS-1000 to the present, I have read everything I could get my hands on trying to obtain an accurate understanding of the Sinclair Logic Chip. There are many viewpoints and different opinions about the functions of this chip.

On April 7, 1988 I decided to use the ROM routines to try and discover just what the SCL does and how it does it. The following is the result of that attempt. There may be some errors or oversights or misconceptions. If anyone wishes to comment pro or con or has questions or something to add feel free to write me. If you desire a return letter, please include a SASE. My address is: DONALD B. LAMEN, RD 3 - BOX 3404, WINDSOR, NEW YORK 13865 .

THE RESULTS

## Prime Clue In Timing:

While running the display routines on paper, keeping track of the timing in microprocessor T cycles, I discovered that each character row scan line takes 207 T cycles. This the key to the entire timing chain.

Taking 207 T cycles as the length of each scan line (including sync and retrace) and going through the entire display routines (including frame sync) I was able to resolve the length of the horizontal sync pulse. The horizontal sync pulse takes 19 microprocessor T cycles.

To understand the Logic Chip we must remember that it is timed by the Dot Clock which is twice as fast as the Microprocessor Clock. Therefore, one scan line is 414 Dot Cycles, the horizontal sync is 38 Dot Cycles, etc..

## The SCL Chip:

The SCL Chip is a Mask Programmable Universal Logic Array (ULA 2C184E ) made by Ferranti in Italy. This chip is programed at the time of manufacture by Photo-Masked deposition according to a table prepared by the equipment manufacturer (Sinclair). The SCL Chip provides the following functions and/or circuits:

- a) Dot Oscillator and Internal Clock
- b) Microprocessor Clock
- c) Internal Timing Chain
- d) Horizontal Sync Generator
- e) Character Scan Line Counter\_3 bit
- f) Internal Data Bus
- g) Intercept Control Circuit
- h) Internal Data Latch
- i) No-Op Generator
- j) Two Shift-Registers\_8 bit, each
- k) Input I/O Port FE\_7 bit
- l) ROM-Driver Buffer\_9 bit
- m) I/O Decoder
- n) NMI Generator
- o) Frame (Vertical) Sync Generator
- p) Video Combiner and Inverter Circuit
- q) ROM/RAM Select Circuit

The purposed function diagram of the ULA 2C184E chip (SCL) goes here.

## DESCRIPTIONS OF THE FUNCTIONS

## Dot Oscillator:

The Dot Frequency is controlled and stablized by a 6.5 MHz ceramic filter used as a crystal in a series resonant circuit. A circuit external to the SCL chip. There is also a series capacitor and a shunt resistor in this circuit.

Referring to the simulation circuit presented further on, the resistor R1 being across the crystal and the capacitor C1 will lower the Q of the circuit broadening the resonance. This helps mask any jitter caused by switching within the chip. Also R1 in conjunction with R2 sets the bias and operating point of the transistor. C3 and C4 being across the filter tends to lower the frequency of oscillation while C1 tends to increase the frequency. The ratio of C3 to C4 determines the amount of feedback.

### Microprocessor Clock:

The Microprocessor Clock is the Dot Frequency divided by two (3.25 MHz) and inverted. This may be generated by a single flip-flop using the Dot Clock both as a clock and as an input. However, it is probably taken from the first stage of the timing chain counters. External to the SCL chip is a circuit built around transistor TR2 which buffers the Processor Clock and re-inverts it.

### Internal Timing Chain:

The Internal Timing Chain must provide the following functions:

- a) Divide the Dot Clock by two to provide the Processor Clock signal.
- b) Provide Turn-On and Turn-Off pulses to the Horizontal Sync Flip-Flop, to generate the Horizontal Sync pulses with a duration of 38 Dot cycles, at the beginning of each TV scan line.
- c) Provide a four bit binary counter (divide by 16). The first three bits of this counter provides the timing for the Intercept Circuit and the first bit may also furnish the signal for the Processor Clock, which would then be inverted and sent to Pin 14. The fourth bit is used to multiplex the two Shift-Registers. The counter's Carry-Out (Overflow) enables the next counter in the string for ONE count.
- d) Provide a second five bit binary counter (divide by 32). By presetting the first counter to the value of 2 and this second counter to the value of 6 and NANDING bit 4 of the first counter with bit 4 of the second counter we obtain our Turn-Off pulse for the Horizontal Sync Generator. The Carry-Out of this second counter provides the Horizontal Sync Turn-On pulse terminating the scan line. This Carry-Out pulse also advances the Character Scan Line Counter and presets the Main Timing Chain, thereby starting the next scan line of 414 Dot cycles. (In the simulation two 4 bit counters are substituted for the 5 bit counter with the Carry-Out of the second counter enabling the third counter and the third counter's Carry-Out taking care of the termination chores. The third counter is preset to 14.)

### Horizontal Sync Generator:

The Horizontal Sync Generator is basically a flip-flop which is turned on and off by the Main Timing Chain. The Output of the Horizontal Sync Generator supplies the Horizontal Sync Pulse to the Video Combiner Circuit. It also supplies the source signal for the NMI Generator and one of the control signals for the Intercept Circuit. These pulses are 38 Dot cycles long and come from the Q output of the flip-flop.

### Character Scan Line Counter:

The Character Scan Line Counter is a 3 bit binary counter (A 4 bit counter is shown in the simulation, but only the first 3 bits are used). This counter is reset by a reset signal which is generated by the Frame Sync Generator and is held in the reset mode until the end of the Frame Sync Pulse. This is necessary because the number of Dot cycles in a scan line is not evenly divisible by eight (the number of scan lines in a character row) and holding the reset affords a method of resynchronizing the counter. The counter is advanced one count at the completion of each scan line. The output of Bits 1 to 3 (count from 0 to 7) is fed through the first 3 bits of the ROM Driver Buffer (a 9 bit tri-state buffer) to Address Lines A0' to A2'.

### Internal Data Bus:

There is an Internal Data Bus connected to D0 through D7 (8 lines), which carries data to and/or from the following:

- a) Internal Data Latch
- b) NoOp Generator
- c) Two Shift-Registers\_8 bit each
- d) Input Port FE\_7 bit
- e) Lines D6 & D7 to Intercept Control

### Intercept Control Circuit:

The Intercept Control Circuit controls the flow of signals on the Internal Data Bus and Screen Inversion. It's Timing and Control signals come from the following sources:

- a) The first counter of the Main Timing Chain
- b) A15
- c) M1
- d) The Horizontal Sync Generator
- e) HALT
- f) D6
- g) D7

Note: M1 in item (c) and HALT in item (e) should both be over-lined.

The timing counter bits are weighted as follows:

Bit-1	_____	1
Bit-2	_____	2
Bit-3	_____	4
Bit-4	_____	8

The Intercept Control Circuit consists of the following circuits and/or components:

- a) 6 Timing Decoders
  1. Multiplex Timing (Code 8 or Code NOT 8)
  2. Sensing (Code positive edge of 2 AND NOT 4)
  3. Latch-In (Code 1 AND 2 AND NOT 4)
  4. No-Op (Code NOT 2 AND 4)
  5. Latch-Out (Code 2 AND 4) inverted
  6. Load (Code 1 AND 2 AND 4)
- b) 3 Flip-Flops
  1. Intercept Flip-Flop
  2. Inverse Flip-Flop 1
  3. Inverse Flip-Flop 2
- c) 3 Reset Gates
  1. Intercept Reset Gate
  2. Inverse Reset Gate 1
  3. Inverse Reset Gate 2
- d) 2 Multiplexed Clock Gates
  1. Inverse Clock Gate 1
  2. Inverse Clock Gate 2
- e) 1 Inverse OR Gate
- f) 2 Multiplexed Shift-Register Load Gates (1&2)
- g) 6 Inverters

The Intercept Control Circuit works as follows:

The timing of this circuit is controlled by the first counter of the Main Timing Chain, which counts from 0 to 15 over and over except when preset. When preset to 2 it counts from 3 to 15 then goes to 0 (14 counts). Each time this counter returns to 0 it puts out a Carry-Out to the next counter.

On the rising edge the counter's T-cycle 0 (Code NOT 8) the Shift-Registers are switched and Shift-Register 1 becomes inhibited. On the rising edge of the counter's T-cycle 8 (Code 8) the Shift-Registers are switched back, Shift-Register 2 becoming inhibited. The Uninhibited Register now shifts out it's eight bits of data to the Video Combinor.

The inhibit signal is delayed for about a half a Dot cycle the active shift-register time to shift out it's last bit.

The NOT M1 signal is Inverted and ANDed with the signal on A15 then fed to the 'D' input of the Intercept Flip-Flop. At the rising edge of Dot-Cycle 2, of the character set of 8 Dot cycles, (Code 2 AND NOT 4) the signal on the 'D' input is clocked in. If NOT M1=0 AND A15=1 the Intercept Flip-Flop is SET otherwise it is RESET. SETing the Intercept Flip-Flop enables the rest of the timing gates, except for MUX which is always enabled.

During Dot cycle 3 (Code 1 AND 2 AND NOT 4) the data on the Data Bus lines D0 through D5 will be latched into the Internal Latch and the contents of D7 will be clocked into Inverse Flip-Flop 1 if Code NOT 8 or into Inverse Flip-Flop 2 if Code 8. However, if D6=1 (or NOT HALT=0 or during Horizontal Sync), then the Intercept Flip-Flop will reset, disabling the intercept and allowing the Z80 to read the HALT instruction as usual.

During Dot cycles 4 & 5 (Code NOT 2 AND 4) the No-Op Generator is enabled forcing all eight Data lines to 0. The Z80 reads the No-Op instruction and fetches the next byte from the memory.

During Dot cycles 6 & 7 (Code 2 AND 4), while the Z80 is decoding the No-Op instruction and refreshing the memory, the Intercept Circuit enables the Tri-state Output Buffer (ROM Driver), putting the Output of the Character Scan Line Counter on Address Lines A0' through A2' and the Latched Data (Character Code) on Address Lines A3' through A8'. At the same time the Address Lines A9 through A15 contains a copy of the contents of the I Register. This accesses the Dot Code from the ROM, which the ROM places on the Data Bus.

During Dot cycle 7 the 8 bit Dot Code on the Data Bus is Loaded into the inhibited Shift-Register.

During Dot cycle 8 the Shift-Registers are switched and the same operations are repeated, but on the opposite Shift-Register.

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Rest of article and artwork to follow in next issues.

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SPECIAL LIMITED TIME OFFER--WITH PROOF OF RENEWAL TO EITHER TIME DESIGNS OR UPDATES MAGAZINES AND A CHECK FOR \$8, YOU WILL GET 7 ISSUES OF SINCUS NEWS, A EXTRA FOR FREE WHEN YOU SUBSCRIBE OR RENEW YOUR TDM OR UPDATES SUBSCRIPTIONS--OFFER EXPIRES 12-31-88. Syncware was included last month but has since ceased operating.

UPDATES-1317 STRATFORD AVE., Panama City, FL 32404  
TIME DESIGNS MAGAZINE, 29722 Hult Rd., Colton OR 97017

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Back issues of SINCUS NEWS on Oliger Disc, 3 discs, 1983/4, 1985, and 1986 parts of most issues saved. Artwork in many cases not available. Each disc is \$5(pp) for members, \$6(pp) for non-members. Computus Interruptus, a multi part article by Wes Brzozowski, on 2068 interrupts, over 60 pages, corrected copy from orginial series, artwork include with disc versions(Oliger only). Hardcopy(\$15pp)Disc \$5(pp) for members, \$6(pp) for non members.

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## Paul's Page on Pascal \* \*

Well, since it is almost Christmas, and the mailman has not brought many articles YET this month, I thought that seeing as how I am taking at great personal expense a computer science course, I could pass on some of the more important features of programming like the pros do. So hoping the prof doesn't get ahold of this here goes.

SO far there are many important steps you must do BEFORE programming. Steps such as learning the language, figuring out how to turn on the computer, or even finding your way around the keyboard, you have to decide on the TITLE. MY biggest problem started a little earlier, finding a place to park, then trying to find the building, and finally the classroom. These modern buildings don't have normal walls and corridors, no, this is a real puzzle palace, a maze.

A session or two of thinking of names, combinations of letters and numbers, or math symbols is good. Write down 15 or so of the best, and cut them up on small strips of paper, or throw up or down a stairwell. Some favor the top step method, or the bottom step method, I prefer the top down method, using bubble gum on the bottom of sneakers to pick out the best, I get a running start and leap the stairs, and what sticks has gotta be good. Select your Title in this sure fire method, and you are on your way to the "Programming Hall of Fame". To protect yourself from using the same name of other software titles, a search is important.

To conduct a proper title search one must have a copy of 'BYTE' and 'Computer Shopper'. One copy must be at least one year old, the other the latest issue, and it doesn't matter which is which. Thumb thru each issue until you get to a page on which the type is so small you can hardly read it, check for your title. If you can not find the EXACT same name, you gotta winner! By golly. If you are discouraged because of finding someone always picks the good ones, well think of a vegetable or a fruit or even a flower, add a couple three numbers, and viola! a sure fire best selling program name!

Ok, the hard part is almost over, now you gotta figure out the copy protect scheme. Is it gona be a disc device, a code, a lazer imbedded musical note or a good law firm? By lining up the copy protection scheme ahead of time, you have a better idea of the final cost, and how much you gona make. Well quit day dreaming fer a minute about all that loot, and consider going with a disc protection association approved law firm, and surveillance team. For just a couple hunnert per copy, each buyer will be followed for up to five years, or until he sells his PC. The minute the buyer swaps, trades, gives, loans or sells a copy of your program, bang!, a law suit that will triple the lotto in your home state on its best day!

Now, you got the TITLE and the copy protection all done, now for the ah, ...I got it written down here somewhere. Oh yeah, the coding, well I musta mist that one, but here it says be sur@ and indent. so there it is folks this months, paul's page on pascal. Next month we'll discuss the comma, and if enough time the null.

On a serious note folks, several people have indicated an interest in learning Pascal. It is supposed to be a GREAT teaching language, but learning?? It does stress doing your work in english and on paper, and testing it before hand, and documenting like crazy, but I guess it teaches you how to learn a language, sorta like Latin was supposed to be good for you. As a practical language, 'C' is held by many to be the BEST, but it will a long time before I can make that judgement. I started this page in the first coupla weeks of class, when all was EASY- now I am lucky to see the kids on Sunday when the computer lab shuts down early, it is one douzy of a course. So far about 45% have dropped out, and most aint kids!

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Sinclair Computer Users Society est. 1982

—1988 SINCUS OFFICERS 1989—

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SINCUS will leave messages on DFA BBS-(607)754-3420 or 687-4346

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Hello and welcome to NEW members Robert M. Curnutt, Adelphi, MD, and Ivan Zachev, Muskegon, MI; and to ReNEWing members Mr. Marinus Heuseveldt, Lantana, FL; Ken Diédérich, Jacksonville, AR and James Wilson, Akron, Ohio.

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Thanks to Don Lamén, for their help with this issue. Stay healthy!

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#### EXCHANGE DISKS offered by SINCUS

The titles for 4 discs are available for sending a SASE. Swaps are currently available on the Oliger system. We only are able to offer 5.25" discs, specify single or double sided, 40 tracks, double density. The discs contain a compilation of programs from SINCUS members, exchanges and from other User Groups, Compuserve, and other bulletin boards. Each disc is offered by SINCUS at cost for \$2.50 each (PP). Please indicate which disc(s). Send check or money order to; John Colonna, SINCUS, 28 Guilfoyle Ave., Binghamton, NY 13903.

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The previous offer for Larken disc copies of this material is being withdrawn until we get the Larken cartridge to work along side the Oliger B board.

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In addition to the above EXCHANGE Discs, SINCUS also offers: CLONE a two mode, 2068 tape program copier \$6.00 (tape header reader included)-SINCUS NEWS-\$8 per year for six issues. See Computus Interruptus Series (PRINT) special price for limited time. Computus Interruptus Series (DISC) in Oliger Disc formats. SINCUS NEWS back issue discs. Three available, see offer page 8 for details.

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For information on any of the above please send a SASE, and we will be glad to help. Write: Paul Hill, SINCUS, 1229 Rhodes Rd. Johnson City, NY 13790.

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Heard from Larry Kenny, John Oliger and Bill Jones, and all three have been very generous with their time and help- it looks like a disable switch maybe added to the Oliger B board, and while that may work, it still doesnt sound like MAX-DDS report to follow next time. Paul